

cultivation; the improvement of which, with the aid of the chemist, might be expected to afford important results for botany and physiology.

Edenbridge, March 8, 1864.

[To be continued.]

XXX. — *A Description of, and Remarks upon, some Fossil Corals from Sinde.* By P. MARTIN DUNCAN, M.B. Lond., F.G.S. &c.

[Plates XVIII. & XIX.]

It must be evident to all who have studied the distribution of the Corals of the Secondary and Tertiary formations, that the Eocene Coral-Fauna is very poor in genera, and that it is much less important than those of the lower Cretaceous and the Miocene strata. The comparative scarcity of Eocene Corals rendered M. J. Haime's description of seventeen species from the Nummulitic formation of Sinde of great interest, especially as several of them were well known in the French and Savoyard Nummulitic strata, and also because a new genus was added to the fauna*. Since the decease of this gifted naturalist, a part of the Blagrove Collection belonging to the Geological Society of London has remained undescribed†; and a very fine series of Corals from Kurrachee, in the British Museum, also. I was tempted to search for new forms, and found many more than I had anticipated; but all of them are not of Eocene age. MM. d'Archiac and J. Haime appear to ignore the Miocene in the great chain of hills which extends from the "Salt range" almost due south to Kurrachee; but the memoir written by Grant ‡, and illustrated by Sowerby, strongly advocates the existence of more than one Tertiary formation of marine origin. The discovery of three fossils from Kurrachee identical in species with common forms of the Nivajé shale of San Domingo leaves no doubt in my mind that several of the species about to be noticed ought to be separated from the Eocene Coral-fauna.

The following list embraces all the species as yet found in Sinde; and I have appended the other localities where they have been observed. The species which came under M. J. Haime's observation are also noticed.

* Descrip. des Anim. Foss. du Groupe Nummul. de l'Inde, par MM. d'Archiac et Jules Haime, 1853.

† See my note on the Sindian Fossil Corals, 'Quart. Journ. Geol. Soc.' vol. xx. 1864, p. 66.

‡ Trans. Geol. Soc. ser. 2. vol. v. 1837.

List of Fossil Corals from Sinde.

Name.	Locality in Sinde.	Other Localities.
x 1. Trochocyathus Burnesi, <i>J. Haime</i>	Hala Mountains	La Palarea, Europe.
2. — Van-den-Heckei, <i>J. Haime</i>	"	La Palarea, Annot, Europe.
3. — cyclolitoides, <i>J. Haime</i>	Cutch	Vicentin, Corbières, La Palarea, Europe.
p† 4. — sinuosus, <i>Edwards & Haime</i>	Hala Mountains	La Palarea, Europe.
*† 5. Ceratirochus exaratus, <i>Edwards & Haime</i>	"	
*† 6. Oculina Halensis, <i>n. sp.</i>	"	
7. Stylophora contorta, <i>Jules Haime</i>	"	La Palarea, Corbières, Europe.
8. Trochosmia corniculum, <i>Edwards & Haime</i>	"	La Palarea, Europe.
9. — multisinuosa, <i>J. Haime</i>	"	La Palarea, Europe.
10. Stylococnia emarcata, <i>D'Orbigny</i>	"	Paris, Bracklesham, La Palarea, Europe.
11. — Vicaryi, <i>J. Haime</i>	"	La Palarea, Europe.
12. Phyllococnia irradians, <i>Edwards & Haime</i>	"	Castel Gomberto, Europe.
† 13. — Lucasana, <i>Edwards & Haime</i>	"	Castel Gomberto, Europe.
† 14. — conferta, <i>n. sp.</i>	"	
† 15. Astrococnia Caillaudi, <i>Edwards & Haime</i>	"	
*† 16. Dasyphyllia gemmans, <i>n. sp.</i>	"	
† 17. Montlivaltia brevis, <i>n. sp.</i>	"	
18. — Granti, <i>J. Haime</i>	"	
19. — Jacquemonti, <i>J. Haime</i>	"	La Palarea, Coustouge, Europe.
20. — Vignei, <i>J. Haime</i>	"	
§*† 21. Antillia ponderosa, <i>nobis</i>	" Sinde Tertiaries	Jamaica, San Domingo, Guadeloupe. (West-Indian Miocene.) San Domingo. (West-Indian Miocene.)
*† 22. — dentata, <i>nobis</i> , var.	"	
*† 23. — plana, <i>n. sp.</i>	"	

*† 24.	<i>Cladocora Haimæi, n. sp.</i> . . . . .	..	..
† 25.	<i>Hydnophora rudis, n. sp.</i> . . . . .	..	..
† 26.	— <i>Danaæ, n. sp.</i> . . . . .	..	..
† 27.	— <i>plana, n. sp.</i>	Hala	Mountains
† 28.	— <i>hemisphærica, n. sp.</i> . . . . .	..	..
† 29.	<i>Solenastrea</i> — <i>sp.?</i> . . . . .	..	..
30.	<i>Siderastrea funesta, Edwards & Haimæ</i>	..	..
31.	<i>Cyclolites Vicaryi, J. Haimæ</i>	..	..
32.	<i>Cycloseris Perezi, J. Haimæ</i> . . . . .	..	..
† 33.	<i>Trochoseris aperta, n. sp.</i>	Sinde	Tertiaries
† 34.	<i>Cyathoseris Valmondoisiaca, var., Edwards & Haimæ.</i>	..	..
† 35.	— <i>irregularis, n. sp.</i> . . . . .	..	..
† 36.	— <i>magnifica, n. sp.</i> . . . . .	..	..
*† 37.	<i>Mycedium costatum, n. sp.</i> . . . . .	..	..
*† 38.	<i>Agarcia agaricites, Edwards & Haimæ</i> . . . . .	..	..
39.	<i>Pachyseris Murchisoni, J. Haimæ</i> . . . . .	..	..
*† 40.	— <i>rugosa, Edwards & Haimæ</i> . . . . .	..	..
*† 41.	<i>Porites incrustans, Edwards & Haimæ</i> . . . . .	..	..
*† 42.	<i>Coralium pallidum, Michelotti</i> . . . . .	..	..

Val de Ronca, Europe.
 Nice, Gap, Gaudon, Europe.
 Auvert, Assy, Europe.
 San Domingo, American Seas. (West-Indian Miocene and recent.)
 St. Bonnet, Europe.
 Recent, Pacific.
 Turin, Bordeaux, Dax, Vienna, San Domingo. (Europe and West-Indian Miocene.)
 Turin Miocene, Europe.

† Corals not noticed by M. J. Haimæ or by any other geologist.

* Corals certainly not pertaining to the Eocene fauna.

x Animaux fossiles de l'Inde, D'Archiac & Haimæ.

p Histoire Naturelle des Coralliaires, Milne-Edwards and J. Haimæ, vol. ii.

§ "On the Fossil Corals of the West Indies," Proc. Geol. Soc. vol. xix. 1863.

1. *Trochocyathus sinuosus*, Edwards & Haime.

A young specimen of this gigantic species is amongst the Sinde Collection in the British Museum. Locality, Kurrachee. European localities, La Palarea, Vicentin, Corbières (Eocene).

2. *Oculina Halensis*, n. sp. Pl. XVIII. fig. 1.

Corallum branching, the terminal branches being straight, tapering, and cylindrical. The calices are very prominent, and project obliquely; they are arranged in four parallel series, two being on opposite sides of the corallum. The calices of the opposite series are on the same level, and those of the intermediate pair are midway; consequently there is more or less of a spiral distribution. The calicular edges are rather sharp, and the costæ are continued down the projection, but not on to the cœnenchyma, which is faintly granular. The septa are small, and form six systems; there are three cycles generally. The laminæ are barely exsert, and the primary septa are stout. The pali are very small, being appended to the first and second orders of septa. The columella is small. Occasionally there is a fissiparous growth. Diameter of branches $\frac{1}{10}$ — $\frac{2}{10}$ inch. Projection of calices $\frac{1}{20}$ — $\frac{1}{10}$ inch; breadth of calices $\frac{1}{20}$ — $\frac{1}{15}$ inch.

Locality, Sinde Tertiaries. Coll. Geol. Soc.

This species, from its granular cœnenchyma and short costal striæ, is more closely allied to the Eocene *Oculina conferta* than to any others of the genus; but the shape of the corallum and the lateral and very prominent calices are sufficient to distinguish the new species from any other; but they bring it into alliance with forms later than the Eocene.

3. *Phyllocœnia conferta*, n. sp. Pl. XVIII. fig. 2.

The corallum is flat, slightly convex above and gibbous below. The corallites are short, distinct, crowded, occasionally deformed, and generally variable in size. The calices are circular or elliptical, and irregular in shape; they are barely exsert, are very shallow, differ in size, but have well-developed costæ, feebly developed septa, and rudimentary columellæ. There is a small amount of cœnenchyma between some corallites. The costæ are close and crowded, a little inclined, not dentate, but simply ridged; and according to the paucity of septa in the corallites, so are the costæ unequal in size. In fully developed corallites the costæ are subequal; but in the majority the alternate costæ are the longest, although the intermediate, which correspond to small septa, are often the thickest. The septa are more delicate than the costæ, are hardly exsert, but dip at once downwards and inwards; they are generally alternately large and small,

the latter being often rudimentary. There are six systems and three cycles, but many of the oval and irregular calices have some orders of the fourth cycle in some systems. There is either no columella or simply the rudiments of one. Diameter of the calices $\frac{3}{10}$ — $\frac{2}{10}$ inch, of oval calices $\frac{1}{4}$ inch.

From the Sinde Tertiaries, Kurrachee. Coll. Brit. Mus.

This species belongs to the *Phyllocæniæ* with crowded costæ, and is therefore closely allied to *P. compressa* and *P. sculpta*. Its crowded calices distinguish it from the last species, and the slightly exsert calices distinguish it from the first. The crowded costæ, close and slightly exsert calices, and the flat form together distinguish this species from any of those already known.

4. *Phyllocænia Lucasana*, Edwards & Haime.

A specimen of this Coral is in the Coll. Geol. Soc. Locality, Sinde Tertiaries.

The species is found in Europe at Castel Gomberto (Eocene).

5. *Astrocænia Caillaudi*, var., Edwards & Haime.

A magnificent specimen of this species is in the British Museum. It simply differs from the type in its large calices and general luxuriance of growth.

Locality, Sinde Tertiaries. Europe, at La Palarea and Coustonge.

6. *Dasyphyllia gemmans*, n. sp. Pl. XVIII. fig. 3.

The corallites are long, slender, close, slightly compressed and more or less flattened here and there. The "frills" can be traced inferiorly. The calices are compressed, rather deep, and present a central and well-developed columella. The septa are long, delicate, and numerous; there are four cycles, and the third order of septa joins the second close to the columella. The costæ, although much worn in the specimen, are subequal; and many are rudely spined, especially near the calices and externally. There are numerous lateral buds, and the corallites appear to be joined by extraneous matter and by offshoots of the rudimentary epitheca. Height of corallites 8 inches. Length of calice $\frac{8}{10}$ inch; breadth of the calice $\frac{5}{10}$ inch.

Locality, Sinde Tertiaries. Coll. Geol. Soc. and Brit. Mus.

There are three species of this genus described by Edwards and Haime—the recent *D. echinulata* of Singapore, the *D. Michelotii* of the Bormida Miocene, and the *D. Taurinensis* (*Lobophyllia contorta*, Michelin) of the Turin Miocene.

The new species is closely allied to *D. echinulata*, differing from it, however, in the height and flattened form of the corallum, the slightly projecting and barely spinous costæ, together

with the numerous buds. It is distinct from the Miocene species.

7. *Dasyphyllia* —, sp.?

Several specimens of a species of this genus, with collared eminences, are in the British Museum as well as in the Geol. Soc. Coll.

8. *Montlivaltia brevis*, n. sp. Pl. XVIII. fig. 4.

The corallum is short, and has a large base, which equals the calice in diameter. The calice is very nearly circular and very shallow. The septa are crowded, thin, and long; and there are five cycles of them, with occasional orders of a sixth; the higher orders are small, and extend but a little way from the wall, while the larger septa meet nearly in the centre of the calicinal space. The septa are evidently not very exsert. The costæ are distinct, parallel, and generally equal: close to the calice they appear to have been dentate; but elsewhere, the presence, and the evidences of the former existence, of an epitheca render them more or less indistinct. There are traces of an exotheca. Height of corallum $\frac{5}{10}$ — $\frac{7}{10}$ inch. Breadth of calice 2 inches.

From the Sindh Tertiaries. Coll. Geol. Soc.

This species is very closely allied to *M. sessilis* (*Anthophyllum*, Goldfuss), and less so to *M. detrita*.

9. *Antillia plana*, n. sp. Pl. XVIII. fig. 5.

The corallum is very short, and has a flat base, which equals the calice in diameter. The calice approaches somewhat the figure of 8, is stout at the margin, rather shallow, and presents a prominent circular parietal columella. The septa are crowded at the margin, but less so close to the columella; the primary are the largest, being not much larger, however, than the secondary; the tertiary are delicate, and reach, with those already noticed, to the columella. The higher orders of septa are small, and in some systems the highest are rudimentary. There are five cycles of septa, in six systems. The costæ are of two kinds—one subequal and large, the other very small and only reaching a little distance from the calicular margin. The columella is lax, large, and occupies some space, being also nearly circular. The greatest depth of the calice is a little external to the columella. The epitheca is noticed here and there, but generally the distinct and rather prominent plain costæ are uncovered by it. Height of coral $\frac{3}{10}$ to $\frac{4}{10}$ inch. Width of the calice $\frac{1}{10}$ inch; length of the calice $\frac{1}{5}$ inch.

From the Sindh Tertiaries. Coll. Geol. Soc.

The shape and large fixed base distinguish this species. It is allied to *A. ponderosa*.

10. *Antillia dentata*, var., nobis.

Quart. Journ. Geol. Soc. vol. xx. p. 29.

The coral has a broad base; the epitheca is well developed, and the columella also.

From the Sinde Tertiaries, Kurrachee; also from Jamaica (Miocene). Coll. Brit. Mus.

11. *Antillia ponderosa*, nobis.

Montlivaltia ponderosa, Edwards & Haime.

A small and worn specimen is in the British Museum.

Sinde. Jamaica, Guadaloupe, and San Domingo (Miocene).

12. *Cladocora Haimeii*, n. sp. Pl. XVIII. fig. 6.

Corallites long and very slightly flexuous: the buds are few, and leave the parent singly at an acute angle, but often become attached to it again. Calice circular. Septa small and delicate, the larger being much smaller than their costæ. Three cycles are generally complete, and the septa of the third order are smaller than the others. In one specimen the septa are crooked, most probably from post-mortem pressure from without. Columella small, and the pali also. Costæ alternately large and very small, there being twelve large and usually twelve small; the larger are much produced. Width of calice and of large corallites $\frac{2}{10}$ inch.

The species is more closely allied to *Cladocora manipolata* and *C. Michelottii*, Edw. & Haime (both Miocene forms), than to any others.

13. *Hydnophora rudis*, n. sp. Pl. XIX. fig. 1.

Corallum thick, its upper surface more convex in the middle than at the sides, and covered by numerous monticules of many shapes and sizes, whose base is usually flat, and whose upper extremity is generally sharp, cristiform, and irregular in its direction. The larger monticules are compressed, inclined, and sharp, whilst the smaller are conical. The septa are numerous, very slightly projecting, equal, and usually enlarged at their inferior extremity. The costæ are seen on the under flat surface of the corallum as faint parallel lines, and are alternately large and small. Width of the valleys from $\frac{1}{5}$ – $\frac{1}{3}$ inch; height $\frac{1}{10}$ – $\frac{2}{10}$ inch; ten septa in $\frac{1}{4}$ inch. Thickness of corallum $\frac{3}{4}$ – $1\frac{3}{4}$ inch.

The species is closely allied to the next, to *H. plana*, and to the recent *H. Demidoffi*, Fischer.

Kurrachee. Coll. Brit. Mus.

14. *Hydnophora Danae*, n. sp. Pl. XIX. fig. 2.

The corallum is tall, very thick, and its upper surface is small

and flat. The monticules are very small, and are much less than the corallites; they resemble small insects, are compressed laterally, very slightly elevated, and are wide apart. The septa are numerous, and the longest arise from the middle of the monticule; they are alternately very short and long, and are often enlarged at the free extremity, but otherwise are straight and thin. Height of corallum $3\frac{1}{4}$ inches. Length of monticules $\frac{1}{10}$ inch, breadth $\frac{1}{30}$ inch; width of series $\frac{1}{10}$ — $\frac{2}{10}$ inch.

Locality, Sindh Tertiaries. Coll. Geol. Soc.

The minute monticules, their compressed form, and septal arrangement distinguish this species.

15. *Hydnophora plana*, n. sp. Pl. XIX. fig. 3.

Corallum foliaceous; its upper surface level, and marked by numerous conical monticules rather inclined and often in parallel series, whilst the lower is indistinctly marked by faint costæ. The monticules are irregular in size, rarely thin above, often compressed in the direction of the series, and varying in height. The septa are distinct, and a large one is usually succeeded by a smaller. Width of the valleys $\frac{1}{4}$ inch, depth $\frac{1}{2}$ inch; ten large and ten small septa in $\frac{1}{4}$ inch.

Locality, Sindh Tertiaries. Coll. Geol. Soc.

This species is allied to two recent species, but has only a generic affinity with the Eocene *Hydnophora Bronni* and with the next form described. The alliance with *H. Demidoffi* and *H. exesa* is close: they are both from the Indian Ocean.

16. *Hydnophora hemisphærica*, n. sp. Pl. XIX. fig. 4.

Corallum irregularly hemispherical, concave below, and very convex above. Monticules very irregular in size and shape: the majority very small, and conical; the rest either larger and conical, or large and very long in the direction of the series, and all appearing to have been sharp at the summit, and rarely compressed. The septa are numerous, delicate, alternately large and small, and crowded. Width of valleys $\frac{3}{20}$ — $\frac{2}{10}$ inch. Height of monticules $\frac{1}{6}$ inch. Height of corallum, $1\frac{3}{10}$ inch.

Locality, Sindh Tertiaries. Coll. Geol. Soc.

This species belongs to the same section as the Eocene *H. Bronni*, but is readily distinguished from it: however, this is the closest alliance it has.

17. *Solenastræa*, sp.

A rolled specimen of a new species of this genus in the British Museum is too much worn for a correct diagnosis to be made. It is easily distinguishable from *S. Verhelsti*. Locality, Sindh Tertiaries.

18. *Trochoseris aperta*, n. sp. Pl. XIX. fig. 5.

The corallum is simple, conical, and short; it is circular and nearly flat above, except at the fossa, but slightly pedunculated inferiorly. The upper surface consists of a central, irregularly circular, and deep fossula, surrounded by a subplane and wide rim, which is marked by numerous and slightly exsert septal prolongations. The external edge of the rim is sharp and is in contact with the epitheca, which is marked slightly by the costal continuations of the septa of the rim. The fossula contains the projecting primary septa, a small flat columella, and the numerous small septa. The septa are in six systems; and in calculating the cycles the horizontal septa of the rim must be considered, although all of them do not reach the fossula. The cycles are irregular, and there are five, with several septa of the sixth. The primary septa are the thickest, and project most into the fossula; but they and all the others are very slightly exsert, and the spaces between them are either closed (as on the rim) by a horizontal floor which hides the numerous synapticulæ, or (as in the fossula) by the synapticulæ. The primary septa, where projecting, are granulated laterally. The secondary septa are distinguishable within the fossula, but not on the rim. The septa of the highest orders extend only a slight distance from the external edge of the rim, and all are more or less dentate. The costæ are faint elevations covered with epitheca. The synapticulæ are very numerous. Height of coral 1 inch. Width of upper surface $1\frac{9}{10}$ inch., of the fossula $\frac{9}{10}$ inch; depth of fossula $\frac{4}{10}$ inch.

From the Sindh Tertiaries, Kurrachee. Coll. Brit. Mus.

The form would resemble a large pedunculated calice of a *Mycedium* with a circular rim including the costæ. I do not consider, however, that it is the parent calice of a compound species. It has only a slight affinity with *Trochoseris distorta* of the French Eocene.

19. *Cyathoseris Valmondoisiaca*, var., Edwards & Haime.

The variety has a broader base and a greater disposition to run into series as regards the calices than the type. The synapticulæ are numerous, and the "collines" are well developed. The species is found in the French Eocene at Auvert, Valmondois, Assy, and Bouconvilliers. (See Michelin, Icon. Zooph. p. 155; D'Orbigny, Prod. t. ii. p. 426, 1850.) The variety, which resembles a *Manicina*, is from the Blagrove Collection of the Geological Society, and is found in the Hala Mountains.

20. *Cyathoseris irregularis*, n. sp. Pl. XIX. fig. 6.

The calices are separated by cristiform walls, and are large

and open in most cases. The outer part of the calice is more or less separated from the inner, and the septa are wide apart, very distinct, and more or less dentate. The costæ on the plicated external wall of the corallum are distinct, large and irregular in size. The synapticulæ are wide apart and distinct. Peduncle not wide. Height of coral $\frac{1}{10}$ inch. Width of a calice $\frac{1}{10}$ inch.

Locality, Sindh Tertiaries. Coll. Brit. Mus.

This species is readily distinguishable by its calices and large irregular costæ; and its calices resemble those of *Trochoseris aperta* in many respects. When worn and deprived of its "collines," this species presents the appearance of a series of cup-shaped depressions with wide interspaces. See specimen in Coll. Geol. Soc.

21. *Cyathoseris magnifica*, n. sp. Pl. XIX. fig. 7.

The corallum is large, convex, and irregularly rounded above, and trochoid, with a small attachment below; the wall is ranged in rounded folds which do not much affect the calicular surface, and it is very faintly costulated. The calicular surface is very Astræan in its appearance; the synapticulæ between the septa determine the family, however. Calices unequal and irregular in shape, simple, not in series, varying in depth, and all more or less infundibuliform; they are separated by a cœnenchyma, which is more or less marked by the costæ, and they are imbedded and are not exsert. The septa are numerous above, but are grouped in paliform masses in contact with the broad flat columella. The wall is thick. Height of corallum $2\frac{1}{10}$ inches, breadth $3\frac{5}{10}$ inches. Breadth of a calice $\frac{5}{10}$ — $\frac{7}{10}$ inch.

Locality, Sindh Tertiaries, Kurrachee. Coll. Brit. Mus.

The convex upper surface, with its crowd of deep calices, distinguishes this species, which is widely separated in its septal arrangement from all the others.

22. *Mycedium costatum*, n. sp. Pl. XIX. fig. 8.

The corallum is in rather thick frondiform expansions, whose under surface is marked by long, parallel, straight, equal, and slightly prominent smooth costæ, and whose upper surface presents calices more or less inclined, a little raised on one side, often deep, separate generally, or occasionally placed on mammillated elevations. The septa are thick at the calicular margin, delicate within, and are continuous with long, parallel, distant, subequal costæ, which are regularly dentate. The columella is very small, and there are two or three cycles of septa. The blunt teeth of the costæ are not restricted to the neighbourhood of the calices. Thickness of corallum $\frac{2}{10}$ — $\frac{4}{10}$ inch. Costæ eight in $\frac{1}{10}$ inch.

From the Sinde Tertiaries. Coll. Geol. Soc. and Brit. Mus.

This is the first instance of a fossil *Mycedium*; and the species is more closely allied to the *Mycedium Okeni* (recent, habitat unknown) than to any other. The parallel, nearly equal, and dentate costæ distinguish the fossil form.

23. *Pachyseris rugosa*, Edwards & Haime.

Hist. Nat. des Corall. vol. iii. p. 85.

A fossil, tolerably well preserved, must be referred to this species, which Michelotti is said to have found fossil on the shore of Cuba, and which inhabits the South Seas.

Locality, Sinde Tertiaries. Coll. Geol. Soc.

24. *Agaricia agaricites*, Edwards & Haime.

The specimen in the British Museum cannot be distinguished from one in the Coll. Geol. Soc., from the San Domingan Miocene.

Locality, Sinde Tertiaries. West Indies, recent. San Domingo, Miocene.

25. *Porites incrustans*, Edwards & Haime.

Porites Collegniana, Michelin; Reuss.

A well-marked specimen of this species, which is found in the European Miocene of Turin, Bordeaux, Dax, Carry, Vienna, Hungary, and in the San Domingan shales, is amongst the fossils from Kurrachee, Sinde. A worn specimen is in the Coll. Geol. Soc.

26. *Corallium pallidum*, Michelotti.

The specimen of this species is of a pale rose-colour, and the striæ are very well developed. The species is hardly separable from *Corallium rubrum*.

Locality, Sinde Tertiaries. In Europe, in the Turin Miocene. Coll. Geol. Soc.

General Remarks.

The specimens in the Geological Society's Museum and in the national Collection are tolerably perfect, and present two forms of mineralization, one of which is distinguished by its dark-red colour, and the other by its paler tint. As a rule, the darker-coloured corals are the oldest; but, as there are several exceptions to the rule, colour cannot be employed in distinguishing the Eocene from the Miocene forms.

Amongst the species common to the Sindian and European Eocene, and which were not noticed by M. J. Haime, *Trocho-*

cyathus sinuosus and *Astrocenia Caillaudi* are the most remarkable: the first is subject to some variation in its form, like all simple Corals, but the specimen from Sinde is, even in its mineralization, undistinguishable from others found in the Maritime Alps of Europe; and the last is a gigantic specimen, with very remarkable, thick inner terminations to its principal septa. The specimen of *Cyathoseris Valmondoisiaca* is very like the drawing of the French form by Michelin.

It must suffice to assert the strong probability of the new species being of more than one Tertiary age, until careful collectors transmit specimens with their localities marked on the geological maps. The new Eocene species would appear to be:—*Phyllocenia conferta*, *Montlivaltia brevis*, *Hydnophora rudis*, *H. Danae*, *H. plana*, *H. hemisphærica*, *Trochoseris aperta*, *Cyathoseris irregularis*, and *C. magnifica*. The Miocene species are probably *Dasyphyllia gemmans*, *Antillia dentata*, *A. plana*, *A. ponderosa*, *Mycedium costatum*, *Agaricia agaricites*, and *Porites incrustans*; and the *Oculina Halensis*, *Cladocora Haimei*, *Pachyseris rugosa*, and *Corallium pallidum* are either of a late Miocene age or of a still later geological epoch.

EXPLANATION OF THE PLATES.

PLATE XVIII.

- Fig. 1. *Oculina Halensis*: *a*, terminal portion of a branch, natural size; *b*, side of calice, magnified 6 diameters.
 Fig. 2. *Phyllocenia conferta*: *a*, corallum, natural size; *b*, calices, magnified 6 diameters.
 Fig. 3. *Dasyphyllia gemmans*: *a*, corallum, one-half the natural size; *b*, part of corallum, natural size, showing the aborted branches and the worn costæ; *c*, calice, natural size.
 Fig. 4. *Montlivaltia brevis*: *a*, corallum, natural size; *b*, side views of portion of the corallum, showing the epitheca and costæ, magnified 2 diameters.
 Fig. 5. *Antillia plana*: corallum, showing the columella, natural size.
 Fig. 6. *Cladocora Haimei*: *a*, portions of a corallum, natural size; *b*, calice, magnified 6 diameters.

PLATE XIX.

- Fig. 1. *Hydnophora rudis*: *a*, part of calicular surface, natural size; *b*, monticules, magnified 2 diameters.
 Fig. 2. *Hydnophora Danae*: side view of corallum, one-third the natural size; *a*, monticule, magnified 4 diameters.
 Fig. 3. *Hydnophora plana*: *a*, part of calicular surface, natural size; *b*, monticules, magnified 4 diameters.
 Fig. 4. *Hydnophora hemisphærica*: monticules magnified 4 diameters.
 Fig. 5. *Trochoseris aperta*: *a*, calicular surface; *b*, side view of corallum; both natural size.
 Fig. 6. *Cyathoseris irregularis*: corallum, natural size.

- Fig. 7. *Cyathoseris magnifica*: a, corallum, two-thirds the natural size;
 b, calice, magnified 2 diameters.
- Fig. 8. *Mycedium costatum*: a, part of calicular surface, natural size;
 b, calice, magnified 3 diameters.

XXXI.—On some new Genera and Species of Mollusca from the Seas of China and Japan. By ARTHUR ADAMS, F.L.S. &c.

ALREADY in the 'Annals' I have made known some conchiferous Mollusks which I believe to be peculiar types of form with which we have hitherto not been acquainted. Such, I conceive, is *Sarepta* among Nuculidæ, and *Cyrilla*, the affinities of which seem to be with *Limopsis*. In this communication I have briefly characterized two other forms which I am unable to refer to any genera already established,—one of which appears to be allied to *Bucardia*, and the other to *Montacuta*. The new species described below are also of great interest on account of their beauty or singularity of construction.

Genus CALLOCARDIA, A. Adams.

Testa cordata, tenuis, lævis, inflata; umbonibus parvis, subspiralibus, approximatis. Cardo (in valva sinistra) dentibus duobus inæqualibus, cum foveola angusta arcuata interposita, munitus; dente antico valde prominente, in medio angulatim flexo cum fossula antica et postica instructo, margine quadricuspidato; dente postico obliquo, arcuato, angusto, elongato, margine denticulis duobus vix elevatis instructo; dentibus lateralibus nullis. Pallii linea simplex; impressiones musculares semilunares.

This genus is proposed for the reception of a beautiful shell, of which, unfortunately, I possess but a single valve, which in general appearance most nearly resembles a *Bucardia*. The surface of the valve is simple, as in *B. cor*, but it is not covered with an epidermis. The complicated nature of what I have termed the anterior cardinal tooth, which is furnished with four prominent cusps, and is angularly bent on itself in the middle, with a triangular pit on each side, together with the absence of lateral teeth, will distinguish *Callocardia* from the *Isocardia* of Lamarck. The genus *Anisocardia* of M. Munier-Chalmas, founded on a fossil shell from the Kimmeridge Clay of Havre, appears to bear some resemblance to my proposed genus; but in that form the surface of the valves is radiately grooved, the anterior muscular scar projects as in *Cucullæa*, and the disposition of the hinge-teeth seems to be very different.

Callocardia guttata, A. Ad.

C. testa cordata, inflata, lævi, nitida, alba, maculis irregularibus aurantiacis conspersis pulcherrime guttata, superficie lineis incre-